

**Exhibit 121**

IN THE UNITED STATES DISTRICT COURT  
NORTHERN DISTRICT OF CALIFORNIA  
SAN FRANCISCO DIVISION

DZ RESERVE and CAIN  
MAXWELL(d/b/a MAX MARTIALIS),  
individually and on behalf of  
all others similarly  
situated,

Plaintiffs,

vs.

No. 3:18-cv-04978-JD

FACEBOOK, INC.,

Defendant.

\_\_\_\_\_ /

-- HIGHLY CONFIDENTIAL --

VIDEOTAPED DEPOSITION OF CHARLES COWEN, PH.D.  
Remote Zoom Proceeding  
San Antonio, Texas  
Friday, April 2, 2021

REPORTED BY:

LESLIE ROCKWOOD ROSAS, RPR, CSR 3462

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Job No. 4494164

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1 for some groups that have a lower SUMA, but they have to  
2 be balanced by some groups that have a higher SUMA, as  
3 long as all of those possibilities average out to the  
4 numbers that were produced by Facebook. So I'm not --

5 Q. BY MS. VALCO: So if we're talking about a 18:10:16  
6 potential --

7 A. Sorry, I'm not done.

8 What I'm trying to say is, is that: Yes, I've  
9 accounted for that. It's in the calculations. I pointed  
10 out the charts in my report that say there are -- rates, 18:10:28  
11 there are lower fake rates. There are lower -- I have  
12 the full distribution on all of them, and then I combine  
13 them into a final estimate of inflation.

14 So I'm not denying that there are groups that  
15 have smaller. The only thing I'm requiring is, is that 18:10:45  
16 they -- that there would be groups that have higher SUMA  
17 rates so that they average to the numbers that were  
18 produced by Facebook.

19 Q. So if I place an ad that's targeted to a group  
20 that has a lower SUMA rate than the average that you used 18:11:01  
21 for your calculations, then your calculations would be  
22 overstating the inflation for that particular group or  
23 audience?

24 MS. PUTTIEVA: Objection. Form.

25 THE WITNESS: No. You're still not getting it. 18:11:19

1 I said that for every group, there are -- I'm sorry. For  
2 all groups, not every group. For all groups, I've  
3 calculated the distribution of SUMA. So if you come  
4 along and tell me that here's a specific group and they  
5 have a lower SUMA rate, it's included in my calculations 18:11:39  
6 already.

7 Q. BY MS. VALCO: So if I target an audience to  
8 detail -- using detailed targeting criteria, and it is a  
9 group that has a lower SUMA rate than the average that  
10 you used, the inflation for that particular group would 18:12:08  
11 be lower than the average that you assumed; right?

12 MS. PUTTIEVA: Objection. Form.

13 THE WITNESS: I just answered this question. I  
14 said that it would be lower, and the inflation rate will  
15 be whatever it is, and the only requirement is, is that 18:12:31  
16 there's some other group that you haven't brought up yet  
17 that has a higher inflation, and they all average the one  
18 value that I did provide. I'm only providing an average.  
19 I'm not providing a value for any individual group.

20 What I am providing for each individual group is 18:12:50  
21 the likelihood that the inflation is less than  
22 10 percent.

23 So as you keep bringing up these specific  
24 groups, I'm trying to point out that there's another  
25 specific group on the other side of the average that has 18:13:03

1 to balance that out. Because otherwise, you're in a  
2 position of being Mr. Amsallem, with everything being  
3 below the average.

4 Q. BY MS. VALCO: Okay. Let's move to another one  
5 of the categories that you discussed, which is the -- 18:13:32  
6 sorry. I'm turning to paragraph 33 again. Actually, no,  
7 this one is not in paragraph 33.

8 I want to talk about the overlap with Instagram  
9 category.

10 Could you please turn to page 23 of your 18:13:56  
11 report -- I believe that's where this is discussed -- of  
12 your December 22nd report.

13 No, sorry. Wrong -- wrong report. Give me one  
14 second here to gather my papers.

15 MS. PUTTIEVA: Nicole, I just want to flag that 18:14:18  
16 I think we've been going to close to an hour. If you  
17 wanted to take a break to go through your papers, that  
18 might be a good time.

19 MS. VALCO: Has it been close to an hour? I'm  
20 sorry, I haven't -- do you know when we got back on the 18:14:36  
21 record?

22 MS. PUTTIEVA: We'd have to check with the  
23 videographer. I have here that we started around 6:15.

24 MS. VALCO: Okay. Let's pause right here for a  
25 break and then -- and we can come back in five to ten 18:14:57

1 STATE OF CALIFORNIA ) ss:

2 COUNTY OF MARIN )  
3

4 I, LESLIE ROCKWOOD ROSAS, RPR, CSR NO. 3462, do  
5 hereby certify:

6 That the foregoing deposition testimony was  
7 taken before me at the time and place therein set forth  
8 and at which time the witness was administered the oath;

9 That testimony of the witness and all objections  
10 made by counsel at the time of the examination were  
11 recorded stenographically by me, and were thereafter  
12 transcribed under my direction and supervision, and that  
13 the foregoing pages contain a full, true and accurate  
14 record of all proceedings and testimony to the best of my  
15 skill and ability.

16 I further certify that I am neither counsel for  
17 any party to said action, nor am I related to any party  
18 to said action, nor am I in any way interested in the  
19 outcome thereof.

20 IN WITNESS WHEREOF, I have subscribed my name  
21 this 6th day of April, 2021.  
22

23   
24

25 LESLIE ROCKWOOD ROSAS, RPR, CSR NO. 3462

**ERRATA SHEET FOR DEPOSITION TRANSCRIPT OF CHARLES COWAN****Case:** *DZ Reserve, et al. v. Facebook, Inc.***Witness:** Dr. Charles D. Cowan, Ph. D.**Deposition Date:** April 2, 2021**Reporter:** Leslie Rockwood Rosas, CSR No. 3462

<b>PAGE : LINE</b>	<b>CHANGE</b>	<b>REASON</b>
Throughout	“Cowen” <b>to</b> “Cowan”	Transcription error.
23:20	“I stand by both of them, yes.” <b>to</b> “I stand by both of them, yes. My reply just has the more conservative assumptions and is more robust because it takes into account changes over time.”	Clarification.
48:4	“I did not” <b>to</b> “I did, but I did not consider or rely on it.”	I misspoke. After my testimony I remembered that I received FB-SINGER-00256367 (Max Martialis Ads_Interfaces_Predicted_Outcomes) but the data therein did not fit with the transactional and targeting data so I did not consider or use it in my analysis.
74:7-10	“And I’d also point out the fact that in my earlier report on the 22 <sup>nd</sup> , I had already conducted a sensitivity analysis that looked at what was the inflation if one eliminated ineligibles.” <b>to</b> “And I’d also point out the fact that in my earlier report on the 22 <sup>nd</sup> , I had already conducted a sensitivity analysis that looked at what was the inflation if one eliminated ineligibles. I misremembered that I also already addressed the March 2019 change in Paragraph 183 of my opening report.”	I misremembered that the March 2019 change is expressly addressed in Paragraph 183 of my December 22, 2020 Report as well is in Appendix 11’s sensitivity analysis. As I state in Paragraph 6 of my March 19, 2021 report, to rebut Dr. Tadelis’ criticism that inflation would fall below the thresholds I found, I more broadly apply the methodology in my opening report to the post-March 2019 time period to demonstrate that inflation levels still reach the thresholds I found in my report.
118:18	“yes” <b>to</b> “not necessarily”	Clarification. Having given this more thought, I do not know if any deflation would occur because some of the MAU could be ineligible accounts.
136: 5	“fake accounts on the SEC” <b>to</b> “fake accounts in the SEC filings”	I misspoke.
136:10	“a case” <b>to</b> “account”	Transcription error.

136:12	“activated” <b>to</b> “removed”	I misspoke. Paragraph 11 of my March 19, 2021 Report states that <i>after</i> the millions and billions of accounts “that are fake and engaged in abusive behavior” are disabled, the resulting MAU is still comprised of 5% Fake accounts.
136:12-13	“that would happen after a determination of fake” <b>to</b> “that would happen before a determination of fake”	I misspoke. Paragraph 11 of my March 19, 2021 Report states that <i>after</i> the millions and billions of accounts “that are fake and engaged in abusive behavior” are disabled, the resulting MAU is still comprised of 5% Fake accounts.
139:2	“these” <b>to</b> “these 5 percent”	Clarification.
139: 4-9	“Well, if they’re active or inactive in dim all user, they made it through the filter for fake and so they’re not considered fake” <b>to</b> “Well, if they’re active or inactive in dim all user, they made it through the first filter for fake and so they’re not considered Fake.”	Clarification. Per Paragraph 11 of my March 19, 2021 Report the millions and billions of accounts “that are fake and engaged in abusive behavior” that are disabled, are removed before Fake accounts are counted in the resulting MAU.
142:7	“there” <b>to</b> “this”	Transcription error.
153:13	“is” <b>to</b> “has”	Transcription error.
160:8	“that value” <b>to</b> “the actual value”	Clarification.
161:16	“square” <b>to</b> “squared”	Transcription error.
178:19	“I do” <b>to</b> “yes”	Transcription error/Misspoke.
218:7	“formulas still apply so” <b>to</b> “the formulas still apply”	Transcription error.
251:1	“Analytics” <b>to</b> “Analytic”	Transcription error.

I, CHARLES D. COWAN, Ph.D., do hereby declare under penalty of perjury that I have read the foregoing transcript of my deposition; that I have made such corrections as noted herein, initialed by me, or attached hereto; that my testimony as contained herein, as corrected, is true and correct.



**Executed on this 6th day of May 2021 in San Antonio, Texas.**

A handwritten signature in black ink that reads "Charles D. Cowan". The signature is written in a cursive style with a large initial "C".

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**Charles D. Cowan, Ph.D.**

**Date:** May 6, 2021